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AUTHOR Howley, Craig B.; Howley, Aimee A.; Shamblen, Steve
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ABSTRACT

Despite the sizable literature on school transportation, little information exists about the social and intellectual implications of long bus rides for students and families or the possible negative consequences of school bus rides. This study examined the nature and experience of riding the school bus in rural as compared to suburban locales in five states. A 38-item questionnaire was completed by 1,194 elementary school principals in Arkansas, Georgia, New Mexico, Pennsylvania, and Washington. Each of the following findings was found in at least four of the five states: rural elementary schools were more likely than suburban elementary schools to have longest rides of 30 minutes or more, to have attendance areas greater than 10 square miles, to have bus routes with rougher rides, to be located in a district without a full-time bus supervisor, and to include middle-school or high school students on the same bus runs as elementary students. In three states, rural principals were more likely than suburban principals to associate length of ride with reduced parental involvement, and in all states, principals in schools with longest rides of 60 minutes or more thought that long rides negatively influenced parental involvement. Many other rural-suburban differences were statistically significant in one to three states. Results provide empirical confirmation of the comparatively adverse conditions contributing to rural parents' and communities' concerns about long bus rides. (Contains 37 references and the survey questionnaire.) (SV)

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The Experience of Rural School Bus Rides

Craig B. Howley
AEL, Inc. & Ohio University

Aimee A. Howley
Educational Studies Department
Ohio University

Steve Shamblen
West Holmes Local School District & Ohio University

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Abstract

This study examined the nature and experience of riding the school bus in rural as compared to suburban locales in five states (Arkansas, Georgia, New Mexico, Pennsylvania, and Washington). Information about the nature and experience of the bus ride was provided by 1194 elementary school principals who completed a survey instrument devised by the researchers. Analytic methods included chi-square tests of crosstabulations of dichotomous variables, independent t-tests of means with continuous variables, and logistic regression prediction for longest one-way rides of 30 minutes or more. Results show sweeping differences that distinguish the school busing experience in rural and suburban locales by state. Among the most persistent findings from state to state (appearing at statistically significant levels in at least four of the five states) are the following: Elementary schools in rural locales are (1) more likely than suburban schools to have longest rides of 30 minutes or more, (2) more likely to have attendance areas greater than 10 square miles, (3) more likely to have bus routes with rougher rides, (4) less likely to be located in districts that employ a full-time bus supervisor; and (5) more likely to include middle-school and/or high school students on the same bus runs as elementary students. Many other rural-suburban differences were statistically significant in one to three states. This study provides empirical confirmation of the comparatively adverse conditions that contribute to the concerns expressed by rural parents and communities about the length and potential dangers of rides experienced by students who attend rural elementary schools.

Riding the School Bus: A Study of the Rural versus Suburban Experience in Five States

Millions of children are transported to and from schools each day, with great efficiency and with comparatively few injuries and fatalities. In rural and suburban areas the appearance of yellow school buses now often serves to mark the time of day for residents.

Early in the century, however, most *rural* children still walked to school; and earlier still, in the 19th century, chief state school officers could set for themselves the goal of creating schools within walking distance of *all children*. Today, though we expect all children to learn, most rural children must do their formal learning at a considerable distance from their homes and local communities (Beaumont & Pianca, 2000).

The Problem of Rural School Busing

Although the busing of children to schools is very common, studies of the characteristics of bus rides in rural and suburban areas, and the experience of riding the bus are represented in educational research hardly at all. This sort of oversight is often (not always, of course) a fair indicator of a topic worthy of more attention. Is school busing such a topic? Clearly, we think it is.

Busing is not, in fact, simply a benign manifestation of the good will and good sense of taxpayers. It is instead a practice of schooling that "inscribes" (to borrow vocabulary from theorists of the postmodern) certain consequences of advanced capitalism that have been challenged forcefully, namely, curtailment of parental and community influence in schooling, the state's prerogatives in exploiting such separation, the view that injury to local communities is a

fair bargain for the sort of education purveyed in the state's schools, the view that children's time is without value (Arons, 1997; DeYoung, 1995; hooks, 1994; Lasch, 1991; Fox, 1996; Witham, 1997), and even the view that children should bear the responsibility for social change (hooks, 1994). In the case of busing for racial desegregation, bell hooks has noted that busing was an odd way of addressing the issue in that it put the burden of social action on school children (hooks, 1994). According to hooks, then, who pays and the price they pay, *is always of interest*.

The price of adulthood might well be an automobile. To be a fully independent adult in the U.S. is difficult or impossible without regular access to a car.[1] This circumstance requires commitment—comfortable or uncomfortable as the case may be—not only to incorporating a particular automobile into one's life, but to the idea of the automobile. And, by extension, it also requires tacit support for the internal combustion engine and for the steel and petroleum industries as presently constituted. Moreover, it entails a profound acquiescence to *the culture of the automobile*: suburban lifeways, culturally toxic mobility (rootlessness), isolation from neighbors, high levels of pollution (hydrocarbons in the atmosphere, mountains of used tires), and so forth. The price is high indeed.

With regard to school busing, the cultural practice most clearly inscribed is the state's forceable separation of children from their parents. At the founding of the Republic, and through the 19th century, most formal learning actually took place at home or in church-sponsored "Sunday schools" (Cremin, 1980). Children walked to school when they could; they attended

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[1] This claim is not completely true, of course. Some groups, like the Amish, foreswear the automobile partially--the Amish not only ride in the cars of non-Amish neighbors, they rely on such transport increasingly. People in the "mainstream of American life," however, can hardly be said to be relinquishing use of the automobile for "greener" modes of transport. As evidence of global damage from the use of fossil fuels continues to mount, that time may yet come.

school as farm needs permitted. As a nation, we appeared to have then believed that children had much to learn at home. Perhaps they did; perhaps more than now. Many critics believe that the current separation—inscribed also in the propensity to bus children long distances from home—has got the best of our culture and now threatens to deliver miseducation instead of education (Arons, 1997; Lasch, 1991; Theobald, 1997). Changes in the lifeworld of ordinary people and in the lifeworld of formal education are profoundly related in ways that are mostly ignored in the practice of education (if not in educational sociology or history).

Reflecting their understanding of these broader social issues, Howley and Smith (2000) argued that three reasons rendered the issue of the influence of school busing relevant to all U.S. school districts. First, they claimed that the particular influences of length of ride on family life and school participation are unknown, not simply in rural areas but everywhere. This reason relates to the state's practice of removing children from their homes and communities in order to provide them with what is believed to be socially necessary education. Second, they maintained that school busing is an enduring cultural artifact, in clear need of unpacking: "failure to study such effects would be akin to a failure of attention among sociologists to consider the effect of the automobile on U.S. culture" (p. 2). Third, they pointed out that the possible influence of school busing on school achievement, particularly among poor or minority students, was unknown but of considerable practical importance. "Who," they wondered, "benefits from long bus rides...[and] who suffers?" (p. 3). If impoverished children suffer academically from lengthy bus rides, the practice of requiring them to endure such rides is sharply out of step with calls for improved performance from schools predominately serving such children.

Rural school busing is of interest for other important reasons as well. The rural lifeworld

of students, families, and communities is under continuous threat from frightening quarters, including "globalization", out-migration, low profits in agriculture, the flight of capital (e.g., plant relocations to the developing world), corporate colonization (e.g., the Wal-Mart effect), and the continuing erosion of community (Barkema & Drabenstott, 2000; Bauman, 1998; Esteva & Prakash, 1996). Though terrible, such threats can be compounded by certain practices of schooling. In particular, lengthy bus rides place burdens on children and families because they extend the times families must spend on obligatory activities, thereby reducing the time that is available for recreation and renewal. This burden constitutes a disruption and a demand for adaptation in the already challenging lives of rural community members. Removing children to distant schools for very long days away from home has been shown, in one seminal study (Fox, 1996), to require substantial adaptation in rural family lives; farm families were particularly hard-pressed to make the unavoidable accommodations.

The practice of busing students to remote schools also contributes to rural opposition to school consolidation (Killeen & Sipple, 2000). Parents, in fact, often cite long bus rides as a reason for opposing state and district plans for school consolidation (e.g., Spence, 2000a). Rural school busing might indeed be understood by people in the communities whose schools have been consolidated as a sort of continuing contingent damage; although the schools are gone (the initial damage), long bus rides continue to impose hardships on the community's children (Spence, 2000a; Zars, 1998). Witham (1997) argues that children's time on long rides has economic value that is not accounted for in consolidation schemes.

Clearly, there are a number of reasons why advocates for rural schools might be concerned to understand more fully the implications of long bus rides. A key point of departure for such

investigations is the comparison of the experience of school busing in rural and suburban communities. The purpose of such an investigation is to determine the extent to which the character and experience of riding the bus differ in the two locales. This determination will assist rural educators and advocates for rural schools to understand whether or not rural families and communities are disproportionately burdened by the mandate that students participate in the state's system of schooling.

Given the foregoing considerations, we framed the research question as follows: "In the estimation of school principals, what are bus rides like for suburban as compared to rural elementary children (e.g., *features of the ride per se*, such as beginning and end time, wait times, time in transit, transfers, and features of the *experience during the ride*, such as terrain, weather, discipline problems)?"

Related Literature

The most notable feature of the professional literature about school transportation is the absence of sufficient information about social and intellectual implications for students, families, and communities. The sizable literature on school transportation principally considers the costs of, equipment for, maintenance of, and management of transportation systems (e.g., Freeman, 1986; Hargroves & Demetsky, 1981; Howley & Smith, 2000; Volk, 1992). The narrower literature on bus safety concentrates primarily on how to avoid injuries and fatalities without additional expense (e.g., American School Board Journal, 1972; National Highway Safety Administration, 1993; Transport Research Board, 1983). As Howley (1999, p. 51) asserted, "The interests that families, communities, and students have in the arrangements and effects of

busing seldom receive any attention from policy makers or researchers." Witham (1997, p. 7) surmised that students' experience of riding the bus is not considered by governmental entities because "the cost of children's time is assumed to be zero." Howley and Smith (2000, p. 2) wondered about parallels between the automobile's effect on U.S. culture and the influence of busing on rural school culture:

> Consider...the fact that the automobile has turned the United States into a suburban nation in many ways.... The way in which school transportation has (possibly) accomplished similar results in education remains uninvestigated. Is it unlikely that schools have been, in some senses, "suburbanized" as well?

Despite the one-sided nature of the literature on pupil transportation, a diffuse literature *has* considered school transportation from the perspectives of institutionalization (what does all this transportation assume or mean?) and policy (what unintended negative consequences might exist?). Some recent scholarship has considered issues from a rural perspective (e.g., Fox, 1996; Howley & Smith, 2000; Killeen & Sipple, 2000; Spence, 2000a, 2000b; Zars, 1998), but the actual knowledge base remains thin and spotty (Killeen & Sipple, 2000; Spence, 2000b; Zars, 1998). The two strands within this more diffuse literature, surveyed next, raise many questions and offer few, if any, conclusive answers.

Institutionalizing school transport. Some work examines the way busing practices have become institutionalized as a normal part of schooling. Unpacking this phenomenon, Killeen and Sipple (2000) claim that (hypothetical) long rural bus rides are the result of technical rationality. Technical rationality has created large schools, professional administration, standardized curricula, and differentiated instruction. If schools organized on these terms must be located at great

distance from rural communities and students' homes, free bus transportation is provided as a matter of course. Although parents may assume that lengthy bus rides have a detrimental effect on academic progress, they have often been led, against their own inclinations, to accommodate the claim of technical rationality that better educational opportunities are available in larger schools (DeYoung, 1995; Volk, 1992).

Arguing in favor of busing for racial integration, Mills (1973) articulated the institutionalizing themes that detail Sipple and Killeen's claim: (1) busing has long been endorsed by state education agencies for rural school consolidation; (2) busing is so widespread it cannot be objected to; (3) busing is required because education is required to advance the well being of the nation and of all individuals; (4) riding the bus is a safe and even pleasant part of the school day; (5) busing reduces the local burden of supporting small neighborhood and community schools. Despite changes in conventional wisdom and historical context since the 1970s, these themes represent a durable ideology of schooling, in which busing can be understood as an inextricable prop and tool. Small school supporters (e.g., Gregory, 1997) have noted that schools are not getting any smaller, despite the new conventional wisdom that "smaller is better." Conventions of school transport may contribute to keeping the dead weight of the status quo in place, through ideological links as much as through material means. Busing, like age-grade-placement, may be another feature of schooling without which schools would seem less "like school."

Possible unintended negative consequences. Unintended consequences of the widely endorsed benefit of providing school bus services to students include (1) rides that have in some cases become unreasonably long, (2) negative effects of length of ride on achievement, and (3) disruptions to family life.

If the provision of school transportation is an undoubted boon to individuals and to the nation, citizens and some educators nonetheless worry about too much of a good thing: rides can be too long. It seems, for instance, unwise, unkind, or even cruel to require Kindergarten and primary-aged children to spend two or more hours a day on a bus in order to receive four or five hours of instruction (Spence, 2000a; 2000b). Many people appear to be disturbed, as well, with requiring high school students to ride buses for four or five hours daily (Zars, 1998). Volk (1992) reports that educators were concerned about length of rides in 1939, just as bus transportation was becoming more common nationwide. Today, *rural* school bus rides are thought to be the longest (Davidson, 1996; Fox, 1996; Killeen & Sipple, 2000; Meehan & DeYoung, 1987; Spence, 2000b; Volk, 1992; Witham, 1997; Zars, 1998). When schools are closed or consolidated, rural parents are vocal about their objections to long rides (Spence, 2000a, 2000b; Zars, 1998).

If rides can be too long, it is possible that longer rides will attenuate or even undo some of the benefits of school attendance. Student achievement would figure as chief among these benefits. The most credible study addressing the issue (i.e., with adequate sample size and controls) is now over a quarter century old. Lu and Tweeten (1973) based their study on a large Oklahoma data set, in which busing for racial integration was *not* at issue. The researchers found a small but statistically significant negative influence of length of bus ride on student achievement. Given its timing, this study was attacked (Zoloth, 1976) because of its possible implications for busing used to achieve racial integration. Lu and Tweeten (1976) provided a very strong rebuttal to the critique, but the study has never been replicated.[2]

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2. The senior authors are presently investigating the possible influence of long rides on the achievement of impoverished students in 10 districts in 5 states. The methodology is very different from that used by Lu and Tweeten. The 1973 study employed OLS regression, with

Questioning the institutionalization of school busing, Fox (1996, p. 22) asserted that "transportation of students to school has become a costly and socially questionable activity." Fox interviewed people in 64 rural Quebec families, and, using the "Household Activity-Travel Simulator" developed at Oxford University, tested the effect of school bus travel time on household activities. He found that long rides reduced the number and variety of household activities and reduced students' sleep time, homework time, and recreational time. Students also reported a variety of school-related ill-effects. Moreover, Fox found that rural farm families were the ones most seriously inconvenienced because their schedules were the least adaptable.

Fox's assertion, if rare, is not, in fact, unique. Beaumont and Pianca (2000) report that school busing is part of a set of institutionalized school practices that contribute to the erosion of neighborhood cohesion (conceived these days as "social capital"). Citing sociologist Robert Putnam and the U.S. Centers for Disease Control, the authors observe

> American adults average 72 minutes every day behind the wheel, according to the U.S. Department of Transportation's Personal Transportation Survey. "This is, according to time diary studies, more than...twice as much [time] as the average parent spends with the kids," writes Robert Putnam in *Bowling Alone*. "Many of our communities have been designed to be convenient for cars, not for children," observe the Centers for Disease Control and Prevention in Atlanta. The freedom of children to explore their communities is "greatly limited when walking is not safe or enjoyable," the Centers add. "Sadly, this

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SES, hours worked per week, and hours spent watching television per day as independent variables. Subjects were 1,959 Oklahoma randomly selected students who completed a questionnaire devised by the researchers; the study was reportedly conducted with the cooperation of the Oklahoma State Education Agency.

deprives our neighborhoods of the activity and laughter of children walking and bicycling to and from school together." (Beaumont & Painca, 2000, p. 14)

Urban locale and riding the bus. The urban experience of school transportation is hypothetically different from the rural and suburban experience. The availability of mass transit systems means that many central city students ride city buses or subways rather than district-provided school buses. In some urban areas, school districts compensate existing mass transit systems for providing transport to students (Volk, 1992). Students in metropolitan areas are also reported as more likely to walk to school, and the percentage of students riding the school bus at public expense is said to be higher in rural than in urban school districts (Beaumont & Pianca, 2000; Jones, Dix, & Clarke, 1983). According to Beaumont and Pianca (2000), however, the accessibility of schools to pedestrians has decreased even in metropolitan areas as a result of the automobile culture.

Quality of extant research base. Anecdotal reports (e.g., Spence, 2000a) and studies with limited samples drawn from a very few schools or districts in a single state (e.g., Fox, 1996; Lu & Tweeten, 1973; Meehan & DeYoung, 1987; O'Brien, 1981) prevail in the portion of the school transport literature relevant to the present study. Even the seemingly self-evident hypothesis that rural rides are longer than other rides does not seem to have been assessed by this literature in any systematic way. Further, comparisons of the bus ride and the experience of riding the bus based on types of locale, state, community wealth, or district size have not been made.

Howley and Smith (1999) report the work of a group of rural education scholars interested in examining the nearly invisible issue of riding the school bus. That report provides a list of topics defined by the group as relevant to examining rural school busing from the

perspectives of communities, families, and students. The group suggested that background information needed to be developed to describe the characteristics of rural bus rides and the experience of riding the bus. The research reported here was designed to address that recommendation. Our review of the literature confirms the need for such study.

Methods

In order to investigate characteristics of the rural school bus ride and to summarize features of the experience of riding the bus, we chose to conduct survey research. The review of relevant literature clearly shows that a shortcoming of extant work is the often severe delimitations imposed by studying single states or a few districts within a state. Survey research offered a way to develop a more representative view of the issues that concerned us.

We chose to survey elementary principals in rural and suburban schools in five states in quite different geographic regions of the country. We surmised that principals—more than teachers, superintendents, or even transportation directors—would be in a position to report accurately on students' experience of riding the bus. Further, we believed that elementary rather than secondary principals would be more attentive to the experiences of their students. Indeed, many rural secondary students drive to school, and this fact reinforced our decision to focus our investigation at the elementary level. Finally, while long bus rides for secondary students are burdensome, the onus of such rides on younger children seems even stronger.

Because the urban experience of school transportation is likely to involve substantially different issues from those in rural and suburban areas, we selected to contrast rural with suburban experiences. The comparatively more healthy economies of suburban as compared to

rural areas, their greater population density, and their hypothetically smaller district and school-attendance areas seemed also to entail sufficient variability to enable fruitful comparisons.

The five states selected for study were Arkansas (midcontinent), Georgia (southeast), Pennsylvania (northeast), New Mexico (southwest), and Washington (northwest). Arkansas and New Mexico are principally rural states, whereas the others are principally suburban. All five states encompass both rural and suburban locales, however. This study incorporates separate state-level analyses because of our conviction that salient differences in policy and practice within states are obscured in samples designed to portray the nation as a whole. In previous work (e.g., Howley & Bickel, 2000; Howley, Howley, & Larson, 1999) we have argued that state-level investigations are critical to policy analysis; rural differences aggregated to the national level, we have argued, are likely to obscure far more than they reveal. We elected not to compare rural - suburban differences in the total sample since generalizability from these five states to any other set of states is tenuous. Implications of this study for practice, advocacy, and research—which issues also concern generalizability and state-level difference—are considered in the discussion section.

Questionnaire development. We developed a 38-item questionnaire to elicit from elementary school principals information about school bus rides. In developing items, the authors considered questions described in *An Agenda for Studying Rural School Busing*, especially under the following four categories: "geographic justice," "consolidation," "social and cultural circumstances," and "outcomes or correlates influenced by busing" (Howley, 2000, pp. 52-55). Though all questions framed within these rubrics could not be answered by principals, many could be.

In order to ensure that principals could interpret the questions and provide reasonable answers, we pilot-tested our items with two groups, principals enrolled in the rural school administration doctoral program (n=6) at Ohio University and another group (n=20) of Ohio principals known to the researchers. We asked the pilot group both to answer the questions and to rate the "answerability" of the items on a scale from 1 to 5. As a result of the pilot-test we reworded most items at least slightly, rearranged the order of items to group thematically similar items more closely together, and substantially revised 11 items.

Questionnaire description. The final revision of the questionnaire contains 38 items, in three sections: (1) basic demographic questions (e.g, school and district enrollment, school and school district attendance areas); (2) characteristics of the transportation system (e.g., percentage of students eligible to ride the bus, full- or part-time bus supervisor, bus driver training); and (3) the experience of riding the bus (e.g., terrain, road conditions, wait time, reports of illness and discomfort, various items relating to transportation modes other than busing, principals estimate of influence of length of ride to parental involvement). A copy of the questionnaire is included as an appendix to this paper.

The questionnaires were coded with the school identification number assigned by the National Center for Education Statistics. Including the code allowed us to add school-level type of locale information from the Common Core of Data to our final data set.

Sample. Our sampling frame was the edition of the Common Core of Data (National Center for Edcucation Statistics, 2000) most current at the time. The frame provided information about all public schools in the chosen states for the 1997-1998 school year. Since we were interested to compare respondents in rural versus suburban locales, we identified the population

of schools in the following types of locales (the Johnson codes, cf. Johnson, 1987): 3 and 4 (suburban--the urban fringe locales) and 7 (the rural locale).

In three predominately suburban states (GA, PA, and WA), we surveyed the rural population, and selected suburban samples of comparable size. In New Mexico and Arkansas, which were predominately rural states presenting comparatively smaller total numbers of schools, we surveyed the rural and suburban populations.

The survey was administered with an original mailing (cover letter, questionnaire, and self-addressed return envelope), followed within 10 days by a reminder postcard, and within three weeks by a second mailing. The administration to Pennsylvania principals took place from late September to early November 2000, and the administration to other states took place from early January to mid-March 2001. Response rates (adjusted for errors in the sampling frame) follow: 71.3% (AR), 51.5% (GA), 55.3% (NM), 55.3% (PA), and 58% (WA). Rural respondents are slightly better represented in the resulting data set than they are in samples as originally drawn.[3]

Analysis. To analyze the survey returns, we reclassified survey items into categories of hypothetically related measures and tested the hypothetical relationships. All comparisons examine differences between rural and suburban areas within each of the five states, treated separately.

With one exception, our methods use cross-tabulation of dichotomized categorical variables and t-tests of means with interval-level data (calculated, where necessary, for unequal

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3. The proportions in the survey data set favoring rural as compared with the drawn samples vary in part with the return rate: 1% (AR), 3% (PA and NM); 3.2% (WA); 4.4% (GA). This may reflect a tendency among larger suburban districts to require advance approval of research projects conducted in their schools. We were notified by two districts in Georgia of this policy.

variances). The single exception was a logistic regression for variables hypothetically related to length of ride. Table 1 provides a complete description of the variables discussed next, divided into five analytic categories.

Insert Table 1 here.

The first analytic category includes variables hypothetically related to length of ride and frequency of long (>=30 minutes) one-way rides. These variables include locale, size of school attendance area, size of district attendance areas, relative student density of school attendance areas, relative student density of district attendance area, and percentage of students eligible to ride the bus.

Our second analytic category deals with hypothetical differences in the transportation systems serving rural as compared to suburban schools. This category contains a set of variables related to personnel and a set related to the proportional constitution of modes of transportation (i.e., driving, walking, busing). The first set of variables includes employment of a full-time as compared to a part-time transportation supervisor, inclusion of bus drivers in special education planning meetings (i.e., I.E.P. meetings), frequency of first aid training of bus drivers, and presence of communication devices in buses. The second set of variables includes percentage of students driven privately to school, net percentage of students riding the bus (i.e., percent eligible less percent eligible but routinely driven to school privately), and percentage of students walking to school. In addition, we included the existence of formal bus discipline policies at the school level and the existence of formal bus discipline policies at the district level in this conceptual

domain because we understand student-related governance as pertinent to the description of the system and not to any of the other categories (length of ride, physical experience, or lifeworld experience).

The third category concerns the physical experience of the bus ride. These variables describe the conditions of road, terrain, and weather that govern the physical experience of the ride. Our data set includes three terrain variables (% bus route miles level, hilly, and mountainous), three road condition variables (% bus route miles over paved major, paved minor, and unpaved minor roads), a weather-related school closing variable, and a "rough ride" index that combines three terrain and road condition variables.

Our fourth analytic category encompasses the lifeworld experience of students riding the bus. This category relates most closely to student experiences in riding the bus, rather than to the physical features of the ride described above. Variables included proportion of students riding the bus with students attending an older grade level (i.e., systems that transport elementary and secondary students together), frequency of transfers mid-route (e.g., students changing buses at another school or other location before arriving at school or home), proportion of students waiting more than five minutes at the beginning or end of the day, average wait times at the beginning or end of the day among those students waiting 5 minutes or more, proportion of students eligible to ride the bus but who are instead transported by parents, and the top three reasons (of eight, including "other") that parents transport student privately.

The fifth and final analytic category includes variables that provide contextual descriptions of the schools. Items in the category are: school grade span, school and district enrollments, subsidized meal rate, existence of a breakfast program at the school, and principal's judgment of

whether or not length of ride had a negative influence on parental involvement. With the exception of the last item, we included the variables in this category principally to confirm the existence of likely differences between rural and suburban schools (see Stern, 1994). We included the parent involvement item here rather than in the first category because it cannot be construed as a *predictor* of length of ride; it is, rather, a hypothetical result of length of ride. As a descriptor of the "school experience," this variable exhibits a better conceptual fit with this than with any of the other analytic categories.

Results

We report results in terms of our five analytic categories. Tables are provided for analyses of interval-level data (t-tests) and the logistic regression previously mentioned. In the case of 2 x 2 frequency tables (cross-tabulations), we report chi-square values and significance levels within the narrative. Table 1 provides descriptions of all variables included in the analyses.

Because this study made rural - suburban comparisons on numerous variables in five states, there is much to report. Considerable variety exists between states; some trends, however, are common to all states or to four of the five states. We treat these "most persistent" results in the greatest detail.

Ride length and associated measures. In all five states the densities of school attendance areas and district attendance areas are greater for suburban than for rural schools. Table 2 presents the means, standard deviations, t-values, and significance levels for these comparisons. The rural-suburban difference in density of the school attendance areas is much greater in Washington than in any of the other states, and the rural-suburban difference in density of district

attendance areas is slightly greater in Washington than in any of the other states.

In four states—Georgia, Washington, Pennsylvania, and New Mexico—there is an association between locale (rural v. suburban) and length of bus ride. There are more rural districts with longest rides greater than 30 minutes (one-way) than chance would predict. Chi square values and probabilities are as follows for these four states respectively: $\chi^2 = 50.66$ (df = 1) $p = .000$, $\chi^2 = 48.72$ (df = 1) $p = .000$, $\chi^2 = 41.51$ (df = 1) $p = .000$, and $\chi^2 = 10.82$ (df = 1) $p = .002$. In Arkansas there is no association between locale and length of bus ride.

Also in these same four states, there is an association between locale (rural v. suburban) and size of school attendance area in square miles. There are more rural schools with school attendance areas larger than 10 square miles than chance would predict. Chi square values and probabilities are as follows for these four states respectively: $\chi^2 = 71.55$ (df = 1) $p = .000$, $\chi^2 = 66.4$ (df = 1) $p = .000$, $\chi^2 = 26.37$ (df = 1) $p = .000$, and $\chi^2 = 9.0$ (df = 1) $p = .004$. In Arkansas there is no association between locale and size of school attendance area.

In four states—Arkansas, Pennsylvania, Washington, and Georgia—larger proportions of rural than suburban students are eligible to ride school buses. The differences are most dramatic in Arkansas and Georgia. In those states, approximately 87% of rural students are eligible to ride whereas approximately 70% of suburban students are eligible to ride. Table 3 presents the means, standard deviations, t-values, and significance levels for these comparisons.

In two states—Pennsylvania and Arkansas—there is an association between locale (rural v. suburban) and size of district attendance area. In Pennsylvania, there are more *rural* schools with district attendance areas larger than 25 square miles than chance would predict. In Arkansas, there are more *suburban* (and fewer rural) schools with district attendance areas larger than 25

square miles than chance would predict. Chi square values and probabilities are as follows for the two states respectively: $\chi^2 = 34.7$ (df = 1) p = .000, and $\chi^2 = 6.16$ (df = 1) p = .011.

Logistic regression prediction of longest rides (less than 30 minutes versus 30 minutes or longer, one-way) based on contextual variables shows that school attendance area has a significant effect in all five states. Larger attendance areas substantially increase the probability of the longest ride being 30 minutes or greater. Additionally, rural location also predicts the chance of a long ride in Georgia and Pennsylvania. Table 4 summarizes the results of the state-by-state logistic regression analyses.

Insert Tables 2, 3, and 4 here.

Differences in the transportation system. In four states—Washington, Pennsylvania, Georgia, and New Mexico—there is an association between locale (rural v. suburban) and districts' employment of a full-time bus supervisor. In these four states, rural districts are less likely to employ full-time bus supervisors than chance would predict. Chi square values and probabilities are as follows for these four states respectively: $\chi^2 = 48.1$ (df = 1) p = .000, $\chi^2 = 28.66$ (df = 1) p = .000, $\chi^2 = 16.64$ (df = 1) p = .000, and $\chi^2 = 14.73$ (df = 1) p = .002. In Arkansas there is no association between locale and employment of a full-time bus supervisor.

In Arkansas, Pennsylvania, and Washington larger percentages of rural students than suburban students ride school buses. In these same states, smaller percentages of rural students than suburban students are driven to school by their parents. (This difference achieves statistical significance in Arkansas and Pennsylvania, but not in Washington). In Pennsylvania and Georgia,

smaller percentages of rural students than suburban students walk to school. Table 5 presents the means, standard deviations, t values, and significance levels for these comparisons.

Insert Table 5 here.

In New Mexico and Washington there is an association between locale (rural v. suburban) and the inclusion of bus drivers in IEP meetings. In both states, rural districts are more likely to include bus drivers in IEP meetings than chance would predict. Chi square values and probabilities for New Mexico are $\chi^2 = 9.5$ (df = 1) $p = .001$, and for Washington, $\chi^2 = 5.36$ (df = 1) $p = .025$. In the other three states, there was no significant rural-suburban difference.

In Pennsylvania and Arkansas there is an association between locale (rural v. suburban) and the practice of equipping school buses with communication devices. In both states, rural districts are less likely to equip school buses with communication devices than chance would predict. Chi square values and probabilities for Pennsylvania are $\chi^2 = 13.27$ (df = 1) $p = .000$, and for Arkansas, $\chi^2 = 10.85$ (df = 1) $p = .001$. There was no significant rural - suburban difference in the other three states.

In New Mexico and Washington there is an association between locale (rural v. suburban) and the existence of a formal school policy on bus discipline. Rural schools are more likely to have such a policy than chance would predict. Chi square values and probabilities for New Mexico are $\chi^2 = 20.52$ (df = 1) $p = .000$, and for Washington, $\chi^2 = 9.79$ (df = 1) $p = .002$. In the other three states, there is no significant rural - suburban difference.

In Arkansas there is an association between locale (rural v. suburban) and the provision of

some or regular first aid training to bus drivers. The rural Arkansas districts are somewhat more likely to provide first aid training to bus drivers than chance would predict. The chi square value and probability are: $\chi^2 = 5.26$ (df = 1) $p = .037$. All respondents in New Mexico and Washington report that bus drivers at their schools receive some or regular training; there is no significant difference between rural and suburban provision of some or regular training in Georgia and Pennsylvania.

Only in Georgia is there an association between locale (rural v. suburban) and the existence of a formal district policy on bus discipline. Rural districts are slightly less likely to have such a policy than chance would predict. The chi square value and probability are: $\chi^2 = 5.03$ (df = 1) $p = .032$. All respondents in New Mexico report that their districts had such policies. In the other three states, there is no significant rural-suburban difference.

Physical experience of the bus ride. With the exception of students in Georgia, rural students ride over more challenging terrain than suburban students do. Rural students in Arkansas, Pennsylvania, and Washington ride over more mountainous roads than suburban students do. In Pennsylvania, Washington, and New Mexico rural students ride over more hilly roads than suburban students do. In Pennsylvania, Washington, and New Mexico suburban students ride over more level road than rural students do. Table 6 presents the means, standard deviations, t values, and significance levels for these comparisons.

In all five states, greater proportions of rural than suburban schools' bus routes travel over unpaved minor roads. In all states except New Mexico, greater proportions of suburban than rural bus routes travel over paved major roads. In Pennsylvania and Washington, as well, greater proportions of rural than suburban schools bus routes travel over paved minor roads. Table 7

presents the means, standard deviations, t values, and significance levels for these comparisons.

Using a composite measure of road conditions, the rough-ride index, we see that rural students in all states experience bus rides that pose more physical challenges than the rides experienced by suburban students. The magnitude of the difference is greatest in New Mexico and least in Georgia. Table 8 presents the means, standard deviations, t values, and significance levels for these comparisons. The states differ significantly, however, in the extent to which their rural bus routes are arduous. According to the index, Arkansas has the most arduous rural bus routes, followed by Pennsylvania, New Mexico, Washington, and Georgia.

In Pennsylvania, Washington, and Georgia there is an association between locale (rural v. suburban) and the extent to which students miss school due to bad weather. Rural students are more likely than chance would predict to experience school closings of 3 days or more due to bad weather. Chi square values and probabilities are as follows for these three states respectively: $\chi^2 = 11.3$ (df = 1) $p = .001$, $\chi^2 = 6.77$ (df = 1) $p = .01$, and $\chi^2 = 6.65$ (df = 1) $p = .015$

Insert Tables 6, 7, and 8 here.

Lifeworld experience of the bus ride. In all five states, rural students are significantly more likely to ride the bus with older students (e.g., elementary students with middle school and/or high school students). The rural - suburban difference is *least* in Arkansas (87% versus 72%) and *much greater* in the other states (40-65% versus 12-19%). Table 9 presents the means, standard deviations, t values, and significance levels for these comparisons.

Insert Table 9 here.

In Arkansas and Pennsylvania only, greater proportions of suburban students are likely to experience waits longer than five minutes at the *end of the day*. In Arkansas, these suburban students have longer waits than rural students. In the other states, average rural and suburban wait times at the end of the day do not differ at statistically significant levels.

Only in Pennsylvania are rural students more likely to experience en-route transfers to other buses than are suburban students. No such rural - suburban differences exist in the other four states.

Only in Arkansas is the proportion of students who are eligible to ride the bus but are instead transported by parents greater in suburban than in rural schools. In the other four states, no significant rural - suburban difference exists.

Only in Washington is the proportion of suburban students likely to experience waits longer than five minutes at the *beginning of the day* greater than the proportion of rural students. Those rural Washington students who do wait, nonetheless have average waits at the beginning of the day that are longer than those of suburban students. In the other four states, the proportions of rural and suburban students waiting at the end of the day and the average end-of-day wait times do not differ.

Three distinct patterns characterize the 3 top-rated reasons (from eight possible choices, including "other") that parents transport their children to school privately. First, rural- suburban choices do not differ within states. Second, in all five states, two of the three top-rated reasons selected by principals are "child preference" and "family convenience." Third, in Arkansas,

Georgia, Pennsylvania, and Washington, "behavior of the child" is rated in the top 3 reasons, but in New Mexico,"open enrollment" out-rates "behavior of the child," and in Washington these two reasons received ratings that do not differ statistically.

Finally, in none of the five states does the frequency of reports of illness or discomfort vary significantly between rural and suburban schools.

Differences in the school experience. In four states—Arkansas, Georgia, Pennsylvania, and Washington—subsidized meal rates in rural schools are higher than those in suburban schools at a statistically significant level. The observed differences in New Mexico are very close to statistical significance (79% rural v 61% suburban, $p = .069$ with unequal variances) and would likely prove significant with a larger sample. Table 10 provides means, standard deviations, t values, and significance levels for these three variables.

In three states—Georgia, Pennsylvania, and Washington—rural principals are more likely than suburban principals to associate length of ride with reduced parental involvement. Chi square values and probabilities are as follows for these three states respectively: $\chi^2 = 4.40$ (df = 1) $p = .036$, $\chi^2 = 11.62$ (df = 1) $p = .001$, and $\chi^2 = 5.40$ (df = 1) $p = .020$. In an ancillary analysis, we computed a between-states means comparison of principals' assessment of influence of length of ride on parental involvement using our undichotomized, 4-point scale. This analysis shows that, in all five states, principals at elementary schools with longest rides 60 minutes or more believe that length of ride has a negative influence on parental involvement.

In four states—Arkansas, New Mexico, Pennsylvania, and Washington—rural schools contain wider grade spans than suburban schools at statistically significant levels. The difference in Georgia is small (6.66 rural v 6.44 suburban) and is not statistically significant. In general, the

differences are not accounted for by K-8 configurations in rural areas of these states, but by K-12 configurations; 98 of the 103 such schools in the full sample are located in rural areas, most in Arkansas (n= 40) and Washington (n = 31).

In four states—Arkansas, Georgia, New Mexico, and Washington—rural schools enroll significantly fewer students than suburban schools. In Arkansas, Georgia, Pennsylvania, and Washington rural districts enroll significantly fewer students than suburban districts.

In Georgia, Pennsylvania, and Washington rural schools are more likely to offer breakfast programs than suburban schools. Chi square values and probabilities are as follows for these three states respectively: $\chi^2 = 6.51$ (df = 1) $p = .011$, $\chi^2 = 14.21$ (df = 1) $p = .000$, and $\chi^2 = 5.14$ (df = 1) $p = .023$.

Discussion

The data analysis shows that some rural - suburban differences persist from state to state across four or five cases. Many rural - suburban differences are state-specific, however, and some are specific to a single state. In few instances did we find that statistically significant rural-suburban differences failed to appear in the analyses. In fact, in 29 of 31 comparisons reported in this study, we established statistically significant rural - suburban differences.

In this section we synthesize the findings of rural - suburban difference that appeared in four or five states. Sample sizes for some analyses were low, especially in the suburban categories of the two predominately rural states (i.e., AR, NM). Larger sample sizes in those instances might have yielded statistical significance. Whatever the case, however, four of five cases represents a substantially persistent cross-case pattern. It is important to keep in mind that

the five cases are regionally diverse, represent different forms of district organization, and reflect considerable variety in ethnic make up and community type.

Longest ride. The duration of longest bus rides is persistently related to locale. Other variables hypothetically related to ride length are also related to locale. The regression analyses show, however, that only the size of the school attendance area predicts length of ride across all states. In two states, rural locale also predicts longer "longest rides."

- Duration of longest ride was persistently related to locale. Rural principals in four states (GA, NM, PA, WA) were more likely to report longest rides 30 minutes or greater than were suburban principals.
- Rural principals (in the same four states) were more likely to indicate that their school attendance areas were larger in area (at least 10 square miles) than suburban principals.
- In all five states, student densities of school attendance areas and school districts were significantly greater in suburban than in rural areas. The rural - suburban difference in school attendance densities was greatest in Washington and least in Arkansas and Pennsylvania.
- Higher proportions of rural than suburban students were reported to be eligible to ride the bus (AR, PA, WA, GA). The proportional difference was about 13% in two states (AR, GA), and less in the others.
- Prediction of which schools were most likely to have longest rides of 30 minutes or more showed *size of school attendance area* (square miles 10 or greater) was uniquely predictive in all states, and the only significant predictor (among 6 entered

in the equation) in 3 of the 5 states. In two other states (GA and PA), however, *rural locale* was an *additional* statistically significant predictor. The prediction equations predicted the 30+ category in from 84% to 97% of cases, depending on state.

Transportation system. In this category, employment of a full-time bus supervisor was more common among suburban than among rural districts. In New Mexico, for instance, 94% of suburban versus 42% of rural districts reportedly employed a full-time transportation director. In Arkansas (difference not statistically significant), the relevant comparison was 53% (suburban) versus 44% (rural). Rural - suburban differences existed on all analyzed variables, but were not persistent across cases.

- The employment of a full-time bus supervisor was associated more strongly with suburban than with rural locale in four states (GA, NM, PA, WA).
- Other features of the transportation system did not persistently vary between rural and suburban locales in more than 3 states (i.e., percentage riding buses, percentage transported privately). Many differed between rural and suburban locales only in one state (i.e., first-aid training for drivers, formal bus discipline at the district level) or in two states (i.e., drivers in IEP meetings, presence of communication devices, school-level bus discipline policy, percentage of students walking to school.

Physical experience of the ride. Evidence clearly shows that in each of these five states, rural students experience substantially rougher rides than their suburban counterparts. We computed a composite "rough ride index" that exhibited substantial rural - suburban differences.

Only our "weather" variable yielded statistically significant differences in fewer than four states (i.e., GA, PA, WA).

- In all five states, rural students were more likely to ride buses that travel greater distances over unpaved minor roads. In Georgia, rural principals reported that 40% of bus route miles were over unpaved minor roads, as compared to 12% reported by suburban principals. In Washington and Pennsylvania, the rural - suburban difference was about 10% (2% v 12%), and in New Mexico about 15% (27% v 12%).
- The reverse was true of bus routes over paved major roads, which predictably favor suburban locales. In Arkansas and Washington, for instance, about 60% of suburban bus miles versus about 40% of rural bus miles reportedly followed paved major roads. These results were *not* statistically significant in New Mexico, where the obtained rural - urban rates were nonetheless 52% v 39% (that is, in the expected direction, though non-significant due to small sample size).
- Our "rough ride index" showed statistically significant rural - suburban differences in all five states. Rural students predictably experienced "rougher rides" than suburban students. The results suggested that Arkansas rural students experienced the roughest ride (mean at the 73rd %-ile of index values by case) and that rural Georgia students experienced the smoothest "rough ride" (mean at the 41st %-ile of index values by case). The roughest suburban ride was in Arkansas (mean at the 52nd %-ile of index values by case).

Lifeworld experience of the ride. The only persistent rural - suburban difference in this

category concerned the experience of riding the bus with students attending another level of schooling (middle-level, high school, or both).

- Rural students in all five states were more likely to ride the bus with older students than were suburban students. In four of the five states (all but AR), *three to four times* the proportion of rural as compared to suburban students reportedly experience this feature of riding the bus.
- Proportions of rural and suburban students waiting to enter classrooms before and waiting for buses after school, and the average wait time experienced by such students did not vary in more than two states. In the affected states more suburban students than rural students tended to experience such waits, but the differences in average wait times did not actually differ by more than a few minutes.

School experiences. Rural schools, as anticipated, differed substantially from suburban schools in most states.

- Grade spans of rural schools were wider than in suburban schools in four states (AR, NM, PA, WA) and school (AR, GA, NM, WA) and district (AR, GA, PA, WA) enrollments were larger in suburban than in rural locales. These findings are completely consistent with national reports (Stern, 1994).
- Subsidized meal rates, as well, were predictably higher in rural than in suburban locales (AR, GA, PA, WA), with breakfast programs more likely to be offered in rural than in suburban schools (GA, PA, WA). All respondents in Arkansas, regardless of locale, reported that their schools offered breakfast programs.

- Principals' assessment of a negative influence on parental involvement related to bus ride was more common in rural than in suburban schools in three states (GA, PA, WA).

Apparently, principals require experience with longer rides in order to reach the conclusion that length of ride influences parental involvement. Across the data set, 39.0% of principals in schools with rides of less than 30 minutes duration believed that length of ride had a negative effect on parental involvement, as compared with 67.3% of principals in schools with longest rides greater than 30 minutes duration. As noted previously, schools in which the duration of longest ride is greater than 30 minutes are more likely to be found in rural than in suburban locales.

Conclusions

Several conclusions are warranted by this study. First, the most important finding, in our view, is that rural - suburban differences appear across a *range of features* of the bus ride that are said to concern communities, families, and students (Fox, 1996; Spence, 2000a, 2000b; Zars, 1998).

Second, some of these *rural - suburban differences persist* across our quite different state cases, often encompassing all five states. Of the following seven specific findings, four concern length of ride. The remaining three each concerns one of our other three analytic categories directly related to riding the bus (transportation system, physical experience of the ride, and lifeworld experience of the ride). Among these persistent features of the ride are: (1) duration of "longest ride," (2) size of school attendance area (the single feature most uniquely predictive of

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"longest ride", together, in two states, with locale); (3) density of school and district attendance areas; (4) eligibility to ride the bus; (5) employment of a full-time bus supervisor; (6) challenges of terrain and road conditions (e.g., as per our "rough ride index"); and (7) likelihood of riding the bus with middle school and high school students rather than with elementary students exclusively. Grade span, school and district enrollment, and subsidized meal rates were also higher in rural as compared to suburban schools, in conformity with descriptive data synthesized by Stern (1994).

Third, on the basis of these two strong patterns of difference, it would be reasonable to hypothesize that the character of the bus ride and the experience of riding the bus differ substantially, *across the nation*, in rural as compared to suburban areas. Though we cannot make this generalization on the basis of statistical inference, the fact that the five states studied differ substantially from one another strengthens the likelihood that this hypothesis would be confirmed in a study that encompassed all 50 states.

Limitations

Findings in this study were delimited by the practical knowledge of principals of elementary schools. The researchers tried to maximize reportable knowledge, and good return rates and low rates of missing data provide two indications that the survey instrument did not overstep the limits of principals' knowledge. However, in order not to overstep such limits, we constructed many categorical variables and minimized the burden of supplying precise interval-level data. Most data are estimates, not precise values. The prevalence of rural - suburban differences may suggest that more precise data would simply bring these differences into sharper focus. We also asked principals to make several judgments (e.g., judgment of the effect of length

of ride on parental involvement and judgment of reasons that parents privately transport children to school), and such judgments are perhaps more subject to inaccuracy than estimates of numerical values. In particular, conventional wisdom and ideology may distort principals' views of these issues to an unknown extent (Howley, Bickel, & McDonough, 1997).

The use of five state case studies, as well, limits generalizability both to other states and to the nation as a whole. A measure of applicability to the nation as a whole, and an encouragement to further study, lies in the pattern of strong rural - suburban differences, both persistent across cases and common to one or several cases. As noted previously, the cases are situated in very different historical, economic, and geographic contexts.

While most other studies have focused on particularly narrow questions (Fox, 1996, is the notable exception), this study has considered a range of issues understood as salient to rural school busing, but not, until now, systematically investigated. In combination with the other limitations, this breadth constitutes a further limitation. Seeking to test some of the supposed verities of rural school busing, the study sacrifices explanation to description. Our logistic regression is perhaps an exception. Even in that instance, however, the regression model is based much more on a convenient taxonomy of variables than on any strongly supported theoretical construct.

Recommendations

This study suggests that school busing is a fruitful domain to examine from a rural perspective. Very little statistically representative work has been done at either state or national levels (Lu & Tweeten, 1973 being a partial exception).

Advocacy. The data sets for the five states possibly contain information that would help advocates of sustainable rural schools respond to attempts at closure and consolidation. In particular we suggest that findings from this study might inform discussions about (1) elementary school enrollment levels needed to assure rides of appropriate duration; (2) the influence of one-campus models of district organization on length of ride; and (3) acceptable grade-span configurations for rural schools. Enlarging schools by increasing grade span might, in fact, be preferable to enlarging schools by increasing attendance area. In keeping with the results of this study, advocates might appropriately continue efforts on behalf of small community schools.

Policy. As Fox (1996) and Zars (1998) note, policy makers have paid no attention to the matters reported here. The fact that the longest (one-way) rides of many rural elementary schools exceed 30 minutes should receive attention from policy makers. Consolidations and rural locale create larger attendance areas, and this study has shown that both size of attendance area and rural locale increase the likelihood that the bus rides of elementary students will exceed 30 minutes each way.

Research. Like most studies, this one answers some questions and not others. In particular, we did not elicit average ride lengths (in designing the questionnaire, we decided that principals were better positioned to judge duration of *longest* ride than duration of *average* ride). The relationship of length of bus ride to variables of interest was thus not possible in this study. The study was sharply delimited by the choice of subjects: principals do not have access to all of the relevant information or to the most precise information.

Both the results and the limitations of the study provide warrant for additional investigations into the phenomenon of riding the bus. In particular, we recommend that the

National Center for Education Statistics include a few questions about busing in future longitudinal studies and in yearly updates of the Common Core of Data. These steps would enable studies in this domain at both state and national levels. So far as national studies are concerned, however, the message from this study is quite clear: substantial differences relevant to rural - suburban contrasts exist between states. National studies can hit the generalities, but may obscure many features salient, or even crucial (e.g., first-aid training of bus drivers), to the rural or suburban circumstance within states.

Studies into the influence of length of bus ride are sorely needed, particularly into the relationship of long rides to student achievement (or, more broadly, school performance) and to levels of, or the experience of, parental involvement. Our particular concern is with student achievement in impoverished communities; in Pennsylvania, for instance, the data suggest that free lunch rates are associated with longer and rougher rides. We do not know how this pattern might influence achievement among individual impoverished students in different states, or any place for that matter. Lu and Tweeten's unreplicated study of the effect of riding the bus on student achievement, clearly the best in the extant literature, remains an incentive for further study.

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Table 1

Variable Key
N = 1194

Focal Variables

state: AR (n=201); GA (n=241); NM (n=79); PA (n=404); WA (n=269)

locale: (Common Core of Data locale codes 3 + 4 = suburban [n=506]; 7 = rural [n=685])

Part I: Ride Length and Associated Measures

dichotomous variables

longest ride (coded 1 for longest ride 30 minutes or more)

school attendance area (coded 1 for area 10 mi^2 or more)

district attendance area (coded 1 for 25 mi^2 or more)

continuous variables

school area density index (school enrollment divided by the value of our undichotomized school area scale [1 = "A < 2 mi^2"; 2 = " 2 >= A < 10 mi^2"; 3= "10 >= A < 25 mi^2"; 4 = ">=25 mi^2"]

district area density index[b] (district enrollment divided by the value of our undichotomized district area scale [1 = "A < 4 mi^2"; 2 = " 4 >= A < 25 mi^2"; 3= "25 >= A < 100 mi^2"; 4 = ">= 100 mi^2"])

percent elibible to ride the bus (percentage of students permitted to ride the bus)

Part II: Differences in the Transportation System

dichotomous variables

full-time bus supervisor (coded 1 for employment of a full-time transportation supervisor)

inclusion of bus drivers in IEP meetings (coded 1 for sometimes or often, 0 for rarely or never)

first aid training of bus drivers (coded 1 for some or regular, 0 for none, infrequent, or irregular)

communication devices on buses (coded 1 for some or all buses, 0 for no buses)

district bus discipline policy (coded 1 for has policy)

school bus discipline policy (coded 1 for has policy)

continuous variables

percentage of students riding buses (bus eligible students minus eligible students driven privately or walking)

percentage of students driven by parents (sum of two variables: bus eligible students nonetheless driven privately plus ineligible students driven privately)

percentage of students walking (percent of ineligible students who walk to school)

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Part III: Physical Experience of the Bus Ride

dichotomous variables

weather (coded 1 for missing 3 or more days of school on average)

continuous variables

level (percentage of bus miles over level terrain)

hilly (percentage of bus miles over hilly terrain)

mountain (percentage of bus miles over mountainous terrain)

paved major (percentage of bus miles over paved major roads)

paved minor (percentage of bus miles over paved minor roads)

unpaved minor (percentage of bus miles over unpaved minor roads)

rough ride index (hilly + mountainous + unpaved minor)

Part IV: Lifeworld Experience of the Bus Ride

dichotomous variables

older (percentage of bus-eligible students riding with non-elementary students)

continuous variables

transfers (percentage of students riding the bus who must transfer to another bus in the course of going to school or returning home)

percentage of eligibles driven instead (proportion of bus-eligible students nonetheless routinely transported to school privately)

percent waiting 2 (proportion of bused students waiting 5 minutes or more to board a bus at end of school day)

percent waiting 1 (proportion of bused students waiting 5 minutes after arrival or more to enter classrooms at start of school day)

average wait time 2 (average wait time for "proportion waiting 1"; based on median of categorical estimates; see instrument)

average wait time 1 (average wait time "proportion waiting 2"; based on median of categorical estimates; see instrument)

reasons (top three rated reasons parents choose to transport students; eight dichotomous variables coded 1 for "marked" 0 for "not marked"; top three-rated were identified with locale means within state

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Table 2

School and District Area Densities

		school area student density					district area student density				
state	locale	N	mean	SD	t	p	N	mean	SD	t	p
AR	S	34	173.9	83.3	5.003[a]	.000	32	1684.7	1752.7	4.424[a]	.000
	R	162	100.0	47.7			156	306.4	406.6		
GA	S	119	330.8	161.4	7.426[a]	.000	110	13935.3	11376.1	9.974[a]	.000
	R	113	193.3	86.5			110	2508.0	3870.0		
NM	S	19	217.3	83.7	5.921	.000	18	3491.7	4846.3	2.267[a]	.036
	R	60	83.8	86.3			58	867.5	1420.7		
PA	S	179	213.4	116.3	7.040[a]	.000	166	1860.4	1355.0	8.940[a]	.000
	R	208	208	138.7			196	849.9	579.8		
WA	S	131	243.7	122.0	10.835[a]	.000	121	4751.5	3991.1	11.808[a]	.000
	R	130	97.8	93.7			130	422.0	602.1		

[a] unequal variances

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Table 3

Percentage of Students Eligible to Ride the Bus

state	locale	N	mean	SD	t	p
AR	R	35	69.0	29.1	-3.456[a]	.001
	S	162	86.6	17.1		
GA	R	121	89.4	17.6	-2.148[a]	.033
	S	114	93.4	10.4		
NM	R	16	83.6	16.1	.814	NS
	S	58	76.2	25.1		
PA	R	174	84.0	26.0	-4.722[a]	.000
	S	208	94.0	11.1		
WA	R	130	71.2	28.5	-2.688[a]	.008
	S	129	79.8	22.1		

[a] unequal variances

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Table 4

Logistic Regression (Longest Ride Greater than 30 Minutes)

Arkansas

variables	B	p	odds (e^B)
school attendance area (A < 10 mi^2 = 1)	-3.737	.000	.024
percentage students bus eligible	1.330	.152	3.781
district attendance area (A < 25 mi^2 = 1)	.021	.094	1.021
school enrollment	.005	.116	1.005
district enrollment	.000	.513	1.000
locale (suburban = 1)	-.974	.385	.378
constant	.147	.910	1.159

Notes.

R^2 = .259 (Cox & Snell); .486 (Nagelkerke)
longest ride < 30 minutes 43.5% correctly predicted
longest ride >+ 30 minutes: 96.9% correctly predicted
overall percentage: 90.1% correctly predicted

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Table 4, continued

Georgia

variables	B	p	odds (e^B)
school attendance area (A < 10 mi^2 = 1)	-1.462	.000	.232
percentage students bus eligible	.490	.361	1.632
district attendance area (A < 25 mi^2 = 1)	.003	.782	1.003
school enrollment	-.002	.084	.998
district enrollment	.000	.068	1.000
locale (suburban = 1)	-1.287	.002	.276
constant	2.675	.017	14.515

Notes.
R^2 = .326 (Cox & Snell); .439 (Nagelkerke)
longest ride < 30 minutes 67.4% correctly predicted
longest ride >+ 30 minutes: 83.6% correctly predicted
overall percentage: 76.9% correctly predicted

Table 4, continued

New Mexico

variables	B	p	odds (e^B)
school attendance area (A < 10 mi^2 = 1)	-1.870	.010	.154
percentage students bus eligible	-.066	.946	.936
district attendance area (A < 25 mi^2 = 1)	-.002	.897	.998
school enrollment	.001	.511	1.001
district enrollment	.000	.222	1.000
locale (suburban = 1)	-1.030	.306	.357
constant	2.303	.110	10.009

Notes.
R^2 = .203 (Cox & Snell); .306 (Nagelkerke)
longest ride < 30 minutes 31.3% correctly predicted
longest ride >+ 30 minutes: 90.6% correctly predicted
overall percentage 76.8% correctly predicted

Table 4, continued

Pennsylvania

variables	B	p	odds (e^B)
school attendance area (A < 10 mi^2 = 1)	-1.171	.000	.310
percentage students bus eligible	-.255	.461	.775
district attendance area (A < 25 mi^2 = 1)	-.013	.061	1.013
school enrollment	.000	.446	1.000
district enrollment	.000	.469	1.000
locale (suburban = 1)	-.596	.044	.551
constant	.393	.744	1.481

Notes.
R^2 = .170 (Cox & Snell); .239 (Nagelkerke)
longest ride < 30 minutes 48.6% correctly predicted
longest ride >+ 30 minutes: 85.9% correctly predicted
overall percentage 74.2% correctly predicted

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Table 4, concluded

Washington

variables	B	p	odds (e^B)
school attendance area (A < 10 mi^2 = 1)	-.978	.019	.376
percentage students bus eligible	-.353	.424	.703
district attendance area (A < 25 mi^2 = 1)	-.002	.830	1.002
school enrollment	.000	.446	1.000
district enrollment	.000	.002	1.000
locale (suburban = 1)	-.615	.227	.540
constant	2.416	.002	11.200

Notes.
R^2 = .292 (Cox & Snell); .415 (Nagelkerke)
longest ride < 30 minutes 62.0% correctly predicted
longest ride >+ 30 minutes: 91.1% correctly predicted
overall percentage 82.4% correctly predicted

Table 5

Percentage of Students Who Walk to School, Ride Buses, or Are Transported Privately

		percentage students who walk					net percentage students riding buses					percentage transported privately				
state	locale	N	mean	SD	t	p	N	mean	SD	t	p	N	mean	SD	t	p
AR	S	26	6.3	11.7	1.748	NS	26	59.6	23.4	-3.740	.000	26	34.1	19.4	3.703	.000
	R	152	3.7	17.1			152	75.7	19.7			152	20.6	16.8		
GA	S	107	3.2	7.6	2.798'	.006	107	72.3	18.4	-1.231'	NS	107	24.4	14.4	.328'	NS
	R	100	1.0	3.0			100	75.2	15.4			100	23.8	15.4		
NM	R	15	5.7	10.2	-1.027	NS	15	73.3	16.2	.355	NS	15	21.1	14.2	.182	NS
	S	50	9.3	12.7			50	70.6	29.8			50	20.0	19.9		
PA	R	165	10.9	20.7	4.020'	.000	165	76.7	26.7	-4.100'	.000	165	12.4	12.0	2.105'	.036
	S	201	3.8	9.4			201	66.1	13.4			201	10.1	8.6		
WA	R	104	16.4	23.7	1.344'	23.7	104	64.4	28.5	-2.171'	.031	104	19.2	16.3	1.914'	NS
	S	107	12.5	18.3			107	72.1	23.0			107	15.4	12.4		

' unequal variances

Table 6

Percentage of Bus Miles Over Level, Hilly, and Mountainous Terrain

		percentage miles level terrain					percentage miles hilly terrain					percentage miles mountainous terrain				
state	locale	N	mean	SD	t	p	N	mean	SD	t	p	N	mean	SD	t	p
AR	S	28	56.3	35.3	.803	NS	28	40.1	32.3	.471	NS	28	3.6	11.0	-3.240[a]	.002
	R	141	50.0	38.5			140	36.9	33.0			140	13.4	26.4		
GA	S	96	76.0	27.4	1.474[a]	NS	94	22.4	26.0	-1.023	NS	93	1.8	9.4	-1.968[a]	NS[b]
	R	92	69.6	31.2			94	26.4	27.0			93	5.8	17.3		
NM	R	16	82.8	26.0	3.120[a]	.003	16	10.3	14.2	-3.070[a]	.003	16	6.7	22.7	-1.420	NS
	S	46	56.0	38.1			46	27.8	30.1			47	16.9	25.0		
PA	R	173	52.5	36.5	6.798[a]	.000	173	44.6	35.6	-3.650[a]	.000	173	2.8	12.5	-5.112[a]	.000
	S	205	29.0	28.5			205	57.5	32.4			205	13.6	26.9		
WA	R	114	66.8	26.8	3.943[a]	.000	116	32.1	26.6	-2.281	.023	114	1.0	4.1	-4.345[a]	.000
	S	104	51.2	31.4			107	40.3	26.6			105	9.1	18.6		

[a] unequal variances
[b] p = .051

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Table 7

Percentage of Bus Miles Over Paved Major, Paved Minor, and Unpaved Minor Roads

		percentage miles over paved major					percentage miles over paved minor					percentage miles over unpaved minor				
state	locale	N	mean	SD	t	p	N	mean	SD	t	p	N	mean	SD	t	p
AR	S	34	53.0	34.4	3.534[a]	.001	34	34.6	28.5	1.219[a]	NS	34	12.2	14.6	-8.674[a]	.000
	R	156	31.0	24.3			156	28.5	22.2			156	40.6	26.4		
GA	S	116	61.1	33.7	4.656[a]	.000	116	35.9	31.8	-1.581[a]	NS	116	3.2	7.2	-8.540[a]	.000
	R	102	41.2	29.4			102	42.1	26.0			104	40.6	26.4		
NM	R	18	52.3	34.1	1.220	NS	18	35.4	31.6	.871	NS	18	12.3	12.5	-2.872[a]	.006
	S	51	39.3	38.3			51	33.7	34.0			51	27.0	29.7		
PA	R	173	51.8	34.1	5.619[a]	.000	173	46.1	33.6	-3.118[a]	.002	173	2.1	6.2	-6.967[a]	.000
	S	205	33.6	27.9			205	56.1	28.3			205	9.8	14.3		
WA	R	117	63.2	34.1	4.681	.000	117	35.0	33.8	-2.492[a]	.013	117	1.8	5.2	-6.117[a]	.000
	S	119	43.0	28.9			119	45.2	28.9			119	11.8	17.0		

[a] unequal variances

Table 8

Percentage of Students Eligible to Ride the Bus

state	locale	N	mean	SD	t	p
AR	R	28	56.7	44.5	-3.090	.001
	S	138	90.6	54.5		
GA	R	94	27.6	29.3	-4.240	.000
	S	85	47.7	34.1		
NM	R	16	28.6	29.2	-4.485[a]	.000
	S	48	73.4	47.0		
PA	R	172	49.8	37.8	-8.337[a]	.000
	S	202	80.7	33.2		
WA	R	112	34.6	27.4	-5.602[a]	.000
	S	102	60.9	39.5		

Notes.

[a] unequal variances

[b] To help readers interpret index values we provide the following information. Across the entire data set (n = 997 valid cases) the "rough ride index" has a low skewness of + .510, a mean of 59.8, a median of 50.5, and a mode of 100, a minimum of 0, and a maximum of 193. By 10th percentile increments, index values are: 5.0, 20.0, 25.0, 45.0, 50.0, 70.0, 90.0, 100.0, and 115.0. Between state differences obviously exist (see narrative), but information based on all cases permits reference to the full range of terrains and road conditions prevailing in reporting schools across the states.

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Table 9

Percentage of Elementary Students Riding with Middle and/or Secondary Students

state	locale	N	mean	SD	t	p
AR	R	35	72.1	39.5	-2.254	.030
	S	158	87.8	25.2		
GA	R	122	17.0	34.0	-7.780[a]	.000
	S	111	58.5	46.0		
NM	R	19	15.6	36.8	-3.742[a]	.001
	S	56	54.3	44.5		
PA	R	172	12.2	29.8	-7.169[a]	.000
	S	202	40.2	45.4		
WA	R	128	18.7	36.5	-9.055[a]	.000
	S	124	64.7	43.6		

[a]unequal variances

Table 10

Percentage of Students Receiving Subsidized Meals

state	locale	N	mean	SD	t	p
AR	R	33	35.6	15.1	-6.962	.000
	S	157	57.7	16.9		
GA	R	119	39.3	27.1	-3.517[a]	.001
	S	115	50.8	22.9		
NM	R	19	61.3	36.6	-1.913[a]	NS (.069)
	S	58	78.7	22.1		
PA	R	164	25.1	21.6	-3.582[a]	.000
	S	178	32.5	16.0		
WA	R	129	30.4	22.8	-5.553	.000
	S	128	46.6	24.0		

[a] unequal variances

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Appendix A

Survey Instrument

Riding the School Bus

Instructions: Please enter the information that, in your opinion, best answers the survey questions. If you serve as principal for more than one school, please select just one school to describe. "Length of bus ride" refers to *time* rather than *miles*, unless otherwise noted.

I. Basic Demographic Questions

A. What is the lowest grade **at your school**?

____ (low grade)

B. What is the highest grade **at your school**?

____ (high grade)

C. Approximately how many students are enrolled **at your school**?

____ (number of students in school)

D. In what sort of **place** is your school located?

___ mostly suburban
___ mostly urban
___ mostly rural

E. Is your **school's** attendance area (in square miles) small, medium, large, or very large?

___ small (less than 2 square miles)
___ medium (more than 2 sq. miles but less than 10 sq. miles)
___ large (more than 10 sq. miles but less than 25 sq. miles)
___ very large (more than 25 square miles)

F. What percentage of your students receives **free or reduced-price meals**?

___% (meals rate)

G. Does your school offer a **breakfast program**?

___ Yes
___ No

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H. Approximately how many students are enrolled **in your district**?

____ (number of students in district)

I. Is your **district's** attendance area (in square miles) small, medium, large, or very large?

___ small (less than 4 square miles)
___ medium (more than 4 sq. miles but less than 25 sq. miles)
___ large (more than 25 sq. miles but less than 100 sq. miles)
___ very large (more than 100 square miles)

II. Characteristics of the Transportation System

1. Does your school provide free transportation?

___ Yes --> **proceed to item 2**

___ No --> Please return this survey; the remaining items will not apply in your case. The return of this survey is important to our study, and we thank you for your cooperation in returning it.

2. Approximately what percentage of your students is **eligible** to be bused to school?
___ % (percent eligible to ride bus)

3. How do those students **not eligible** to ride the bus get to school?
(*please estimate percentages below*)

___% that transported privately by parents or others
___% that walk to school
___% other _____ (please describe)
___% other _____ (please describe)

4. Does your school district have a full- or part-time **transportation coordinator** or supervisor?

___ full-time
___ part-time (role may be one of several assigned to a single individual)
___ role not formally assigned

5. If part-time person, into which other role is transportation supervision folded?

____ Superintendent
____ Assistant Superintendent
____ Principal of each school
____ Other _____
_____ (please describe)

6. Do you, as building principal, schedule and determine bus routes for your students?

____ Yes
____ No

7. Are bus drivers provided documentation about modifications necessary for special-needs students (for instance: copies of IEPs or 504 modifications)?

____ Yes
____ No

8. How frequently are school bus drivers included in IEP meetings?

___ often
___ sometimes
___ rarely
___ not to my knowledge

9. To what extent do bus drivers receive training to provide first-aid in the event of a bus emergency?

____ regular training for this (yearly or every other year)
____ some training for this (some training within a 5-year period)
____ infrequent and irregular training (not planned)
____ none

10. How many buses are equipped with CB radios or other communication devises?

____ all of them
____ some of them
____ none of them, but plans have been made
____ none of them, and no plans have yet been made

11. Does your **district** have a formal bus discipline policy?

___ Yes
___ No

12. Does your **school** have a formal bus discipline policy?

___ Yes
___ No

III. Experience of Riding the Bus

13. What is the terrain traveled by school buses in your area? (*please give us a rough estimate of the percentage of* **miles traveled** over such terrain by buses serving your school)

____% Level
____% Hilly
____% Mountainous

14. What proportion of the following sorts of roads do the buses serving your school travel? (please *estimate* the percentage of miles traveled)

____% paved and major roads
____% paved minor roads
____% unpaved minor roads

15. What, in your estimation, are the **three most common reasons** most parents choose to transport their children privately? (*please check [/] the top three reasons*)

__ Concern of parents with behavior of older children riding the bus
__ Child presents discipline problems
__ Preference of child(for instance: conflicts with other children, boredom on ride)
__ Family convenience (for instance: parent work schedule, more family time)
__ Health or psychological condition of child (for instance: asthma)
__ Dissatisfaction with bus driver
__ Open enrollment (transportation not provided for out-of-district students)
__ Other (*please describe*) _____

16. Approximately what percentage of students must wait longer than 5 minutes to board a bus at the **end of the school day**?

___ % (percent waiting, end of day)

17. Approximately what percentage **of those students who wait** experience waits of the following lengths?

___ % less than 10 minutes
___ % 10 to 19 minutes
___ % 20 to 29 minutes
___ % 30 to 40 minutes
___ % longer than 40 minutes

18. Approximately what percentage of students must wait longer than 5 minutes before being allowed to enter classrooms after they arrive at school at the **beginning of the day**?

___ % (percent waiting, beginning of day)

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19. Approximately what percentage **of those students who wait** experience waits of the following lengths?

___ % 5 to 10 minutes
___ % 10 to 19 minutes
___ % 20 to 29 minutes
___ % 30 to 39 minutes
___ % 40 minutes or longer

20. To the best of your knowledge, **how frequent** are reports of illness or discomfort associated with bus rides among your students?

__ common (daily or every several days)
__ frequent (weekly or every other week)
__ infrequent (monthly or every couple of months)
__ uncommon (perhaps a few each year)

21. To the best of your knowledge, approximately **how long (in minutes)** is the longest bus ride for any student at your school?

___ less than 30 minutes (one-way)
___ 30 to 59 minutes (one-way)
___ 60 to 90 minutes (one-way)
___ more than 90 minutes (one-way)

22. To the best of your knowledge, what percentage of students riding the bus at your school must transfer to one or more other buses in order to get from home to school?

___ % who transfer

23. Approximately what percentage of students who are eligible to ride the bus **are instead driven privately** to school most of the time?

___ less than 5%
___ 5-15%
___ more than 15%

24. To the best of your knowledge, among those students who are eligible to ride the bus, but are instead driven privately to school most of the time, what percentage would have bus rides of the following length?

___% short rides (under 30 minutes one-way)
___% long rides (more than 30 one-way)

25. On average in your experience (please estimate), how many school days are lost or rescheduled due to weather?

____ 0-2 days

____ 3-5 days
____ 6-9 days
____ 10-12 days
____ 12-15 days
____ 15 or more days

26. What percentage of students in your school attendance area actually attend **other schools** because of the length of the bus ride?

___ less than 5%
___ 5-10%
___ more than 10%

27. Of the students who display discipline problems on the bus, *please estimate* the percent of those whose rides are:

___% less than 30 minutes (one-way)
___% 30 to 60 minutes (one-way)
___% more than 60 minutes (one-way)

28. Please estimate the percentage of your students who ride the same bus as students **enrolled in grades higher** than those in your building.

___% (percent riding with older students)

29. In your view, to what extent does the distance between the child's home and school reduce the involvement of parents in activities at the school?

___ doesn't reduce it
___ reduces it a little
___ reduces it more than a little
___ reduces it a lot

Thank you very much for your help. This is one of the first national studies to document students' experience riding the bus.

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